



Mirror, Mirror, Who is the sleepest of them all?

Task One: How much sleep do students get?

The following question was asked about sleep on the CensusAtSchool Questionnaire:

How many hours of sleep do you usually get:

- a. When you have school the next day
- b. When you don't have school the next day?

- 1.** Go to the CensusAtSchool website and use the Random Sampler to obtain a sample of 200 students.

Reference year	<i>Select Year</i>
Select questions	All

- 2.** Copy the data from the CensusAtSchool questionnaire for the question concerning sleep onto a new, blank sheet and determine how much sleep students get today.

<i>Hours of sleep school nights</i>	<i>Average</i>
<i>non-school nights</i>	<i>8.8</i>
	<i>9.9</i>

Teacher Note: This table has been generated using a random sample of 200. Answers have been rounded to one decimal place.

Task Two: Has anything changed since the 1830s?

The following extract was taken from the Report by the Committee on Factory Children's Labour (1831-32), quoted in Bland, Brown and Tawney, 1914: 511.

In 19th century England, children as young as 4 and most commonly 7 or 8 were employed up to 17 hours per day in the mines and factories which drove the industrial revolution.

Q: What time did you get them up in the morning?

A: In general, me or my mistress got them up at 2 o'clock [in the morning] to dress them.

Q: So they had not above four hours sleep at this time?

A: No, they had not.

Q: Were the children excessively fatigued by this labour?

A: Many times; we have cried often when we have given them the little victualling* we had to give them; we have had to shake them, and they have fallen to sleep with the victuals in their mouths many a time.

Q: Did this excessive term of labour occasion much cruelty also?

A: Yes, with being so very much fatigued the strap was very frequently used.

*food

3. How does the amount of sleep children get today compare with the 1830s?

In the 1830's, children had about four hours sleep, compared to children today, who have about nine or ten hours sleep a night. It is not stated whether children in the 1830's had weekends or regular days off, but children today sleep about an hour longer on weekends or non-school nights.

4. In what ways have things changed in the past 170 years?

There are several changes to comment on. Some examples are: The age when children are expected to work, hours in a working day, level of education, hours a day of education, corporal punishment, normal waking up time in the morning, quality of life.

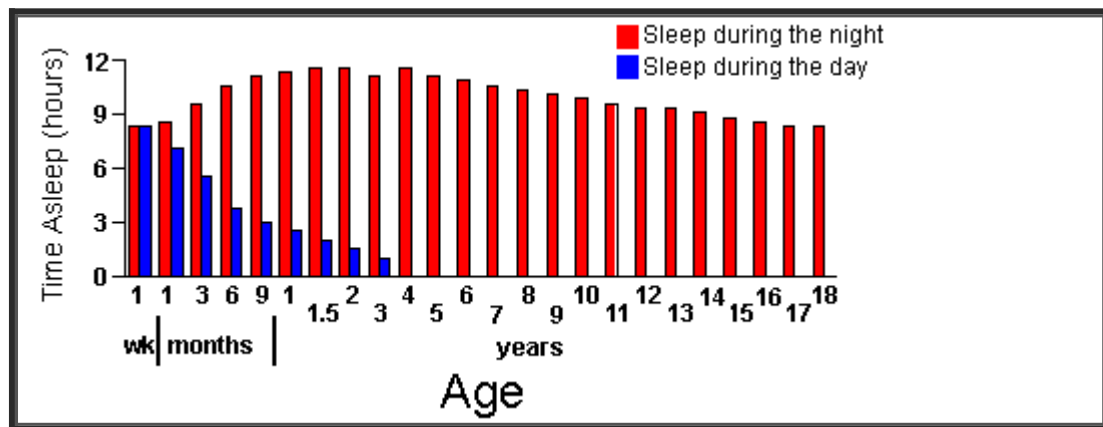
5. What things are still the same or similar today?

There are some commonalities but not many. Some examples are: breakfast, English as the dominant language. We cannot expand beyond the scope of the report.

Task Three: As we get older

A great deal of research has been carried out about sleep. In the sections that follow you will learn a little about some of the research findings and see if Australian CensusAtSchool data supports the research.

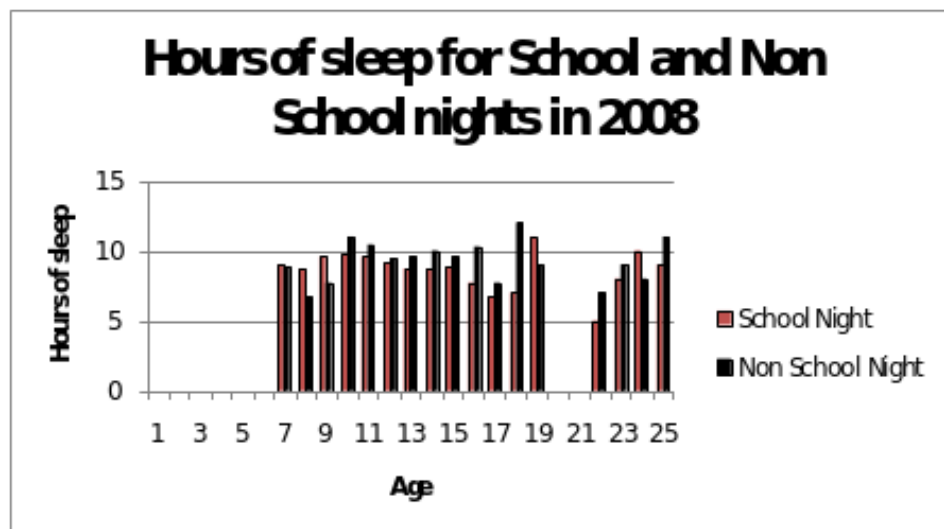
On the web page Neuroscience for kids - Sleep, <http://faculty.washington.edu/chudler/sleep.html> the following graph appears. It displays data taken from Howard, B.J. and Wong, J. Sleep disorders, Pediatrics in Review, 22:327-341, 2001.



6. What does this graph tell us about the time we spend sleeping as we get older?

Babies and toddlers sleep the most of all, with babies sleeping about sixteen hours. As children get older, they sleep less during the day and more during the night. This peaks at about two to four years old, of about twelve hours a day. As the children continue to get older, the amount of sleep slowly decreases to reach just under nine hours a night by eighteen years old.

7. Use your CensusAtSchool data to construct a graph that displays similar information to the one shown above.



8. Does the CensusAtSchool data tell the same story as the data shown in the graph above? Suggest reasons for this.

We cannot tell the same story as the previous graph, as the CensusAtSchool Survey does not give us information on hours of sleep during the day and night. However, we can compare between school and non-school nights. Some age groups of students were absent from the sample used. Both graphs show a decreasing trend between the ages of ten and seventeen, indicating that children between these ages are getting less sleep as they get older.

- 9.** Does the CensusAtSchool data show seventeen year olds get more or less sleep than nine year olds? Suggest reasons for this.
- Nine year olds get more sleep than seventeen year olds. Nine year olds on average have nine and a half hours sleep on a school night, and seven hours and forty-five minutes sleep on a non-school night. Seventeen year olds have on average six hours and forty-five minutes sleep on school nights, and seven hours and forty-five minutes sleep on non-school nights. This difference could be attributed to different stages of development in childhood and adolescence, differences in school commitments, as some seventeen year olds would be doing year eleven or twelve which require a lot of time and is stressful; and lifestyle differences, as seventeen year olds might stay up late with their friends, while nine year olds' bedtimes have more parental guidance.*

Task Four: How much sleep is enough?

The US National Sleep Foundation report that adolescents should get between 8.5 and 9.5 hours of sleep per night. See the web page Teens and Sleep

<http://www.sleepfoundation.org/article/sleep-topics/teens-and-sleep>

(There are a number of interesting topics about sleeping at <http://www.sleepfoundation.org> look under the menu item "Sleep Topics a:Zzzzs")

Much debate in the US centres on the claim that students are starting school too early and as a result are getting too little sleep. The following claim is made on the web page of the Stanford University, The Sleep Well.

<http://www.stanford.edu/~dement/adolescent.html>

"Many High Schools have pushed the starting bell as early as 7:15 a.m. The average American teenager gets 6.5 hours of sleep on a school night, some lots less. There is evidence that many teens snooze through their morning classes."

- 10.** How does the average Australian teenager compare to the average American teenager as described in the claim above?
Since the question indicates high school student; for comparison purposes, our sample is restricted to eleven to nineteen year olds. The averages over this age range show about six hours and thirty-five minutes of sleep on a school night, and nine hours and fifty minutes for non-school nights. This indicates that teenagers in America and Australia have very similar amounts of sleep. The longer sleeping times on non-school nights could indicate that teenagers tend to catch up on sleep on non-school nights.

Task Five: Exploring further

- 11.** Can you find evidence that boys sleep less or more than girls from your CensusAtSchool sample?

Hours of sleep	Mean	Males Mean	Females Mean
school nights	8.8	8.8	8.8
non-school nights	9.9	10.2	9.7

Boys and Girls tend to sleep the same amount of time on school nights, of about eight hours and fifty minutes. On non-school nights, boys slept a longer time than girls. Boys slept about ten hours and ten minutes, while girls slept nine hours and thirty- five minutes. Comparison should be made between mean and median and differences noted and discussed.

Extension

Task Six: Limitations

When making claims based on data, the claims are only as good as the data.

- 12.** Think about the conclusions you have made throughout this piece of work. Do you think the data provided from the CensusAtSchools survey is of the type that gives you a good deal of confidence in your investigations? Explain your thoughts.

Focus on what makes data inaccurate and accurate. For example, is a sample set of two hundred big enough to be accurate? The random sampler gives a random sample from tens of thousands of survey entries, which is a good, large population. The age range of the data meant that for some

ages of students, there were large numbers of samples to take an average from, but for some years there was only one or no data in the random sample.

- 12.** Use your data analysis from question 2 to explain how you convert time represented as a decimal (eg. 9.9 hours) into time showing hours and minutes. Your explanation will need to show all of your working.

$$\begin{aligned}\text{Decimal} &= 9.9 \text{ hours} \\ &= 9 + 0.9 \times 60 \\ &= 54 \text{ minutes.}\end{aligned}$$

So the decimal of time equals 9 hours and 54 minutes.